



UNIVERSITY OF THE PUNJAB

Part-II A/2017
Examination:- M.A./M.Sc.

Roll No.

Subject: Botany (Special Paper)

TIME ALLOWED: 3 hrs.

PAPER: Opt. I (Plant Tissue Culture and its Agricultural Applications)

MAX. MARKS: 75

NOTE: Attempt any FIVE questions. All questions carry equal marks.

- Q.1 (a) What do you know about plant tissue culture and its key applications in the field of agriculture? (8 marks)
- (b) Describe the process of callus formation and its maintenance. (7 marks)
- Q. 2 (a) Define somatic embryogenesis. Describe in detail various steps involved in the formation of somatic embryos. (8 marks)
- (b) What is the usual role of Cytokinins and GA_3 in plant tissue culture? (7 marks)
- Q. 3 Write a short note on the following (5 marks each)
- A) Organogenesis
B) Use of Auxins in tissue culture
C) Inorganic nutrients
- Q. 4 (a) What is the difference between organogenesis and somatic embryogenesis? (5 marks)
- (b) What are the factors affecting shoot organogenesis? (10 marks)
- Q. 5 What are the various stages of micropropagation and its application in plant improvement? (15 marks)
- Q. 6 (a) Write a brief account of the media components and culture conditions required for plant tissue culture. (10 marks)
- (b) Discuss importance of selection of suitable explants in plant tissue culture with some examples. (5 marks)
- Q. 7 (a) Write down a note on the production of secondary metabolites through plant tissue culture. (10 marks)
- (b) What is Germplasm conservation? What is its significance? (5 marks)



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Subject: Botany (Special Paper)
PAPER: Opt.VII (Advance Plant Anatomy)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

NOTE: Attempt any FIVE questions. All questions carry equal marks.

- Q.1 (a) Describe the basic components and structure of cell wall? (8)
(b) Discuss in detail the histology of the fruit wall with the help of diagram? (7)
- Q.2 (a) Write a detail note on external secretary structure? (8)
(b) Discuss in detail the morphology of leaves? (7)
- Q.3 (a) Explain the types and origin of leaf? (8)
(b) Discuss the role of epidermis in detail? (7)
- Q.4 (a) Write comprehensive essay on xylem with special emphasis on types of wood? (8)
(b)? Discuss in detail the evolution of sieve elements in phloem (7)
- Q.5 (a) How the leaf anatomy is changed with changing ecological factors? (8)
(b) Discuss in detail the properties of xylem being conductive tissues? (7)
- Q.6 (a) Discuss in detail the origin and structure of flower (8)
(b)? Write a detail note on the phenomenon of fruit abscission (7)
- Q.7 (a) Write down the morphological significance of root-shoot transition region? (8)
(b) Discuss in detail the secondary growth of vascular system? (7)
- Q.8 (a) Write note on structure of root also differentiates b/w mono and dicot root? (8)
(b)Write a note on economic aspects of applied plant anatomy? (7)
- Q.9 Write a note on the followings
(a) Anomalous secondary growth (5)
(b) Laticifers (5)
(c) Xylem phylogeny (5)



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TIME ALLOWED: 3 hrs.

PAPER: VIII (Plant Anatomy and Taxonomy of Angiosperms)

MAX. MARKS: 60

NOTE: Attempt any FIVE questions from the following. Each question carry equal marks. Support your answers with the required figures.

- (a) Briefly describe the role of anatomical characters in taxonomy.
(b) Define Meristematic tissues. How they classified in plant body?
- (a) What is the Role of Embryology and Paleobotany in taxonomic evidences?
(b) What are Trichomes? How they formed and classify? Also write down their functions.
- (a) Explain the Primary structure of Root in angiosperms with neat and clean labelled diagrams.
(b) Write down origin, structure and functional specialization of the collenchyma tissues.
- (a) Write an account on unit of classification and taxonomic hierarchy.
(b) What is Binomial nomenclature? Briefly describe its history and rules.
- (a) Define a Specie. Explain Taxonomic and biological concept of Species.
(b) Discuss the open and closed types of apical organization in the roots.
- (a) Explain the Takhtajan system of classification. Give its merits and de-merits.
(b) What do you know about numerical taxonomy?
- (a) Write a detailed account on the shape, arrangement, occurrence and function of Vascular cambium.
(b) Explain the terms 'Parenchyma', 'Collenchyma' and 'Sclerenchyma'.



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Subject: Botany
PAPER: IX (Plant Physiology)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 60

NOTE: Attempt any FIVE questions. All questions carry equal marks.

- Q.1 (a) Write a note on Calvin cycle (6)
(b) Differentiate between C₃, C₄ & CAM plants (6)
- Q.2 (a) Discuss the biosynthesis and mode of action of Gibberellins (6)
(b) How are Brassinosteroids unique as plant hormones? Also discuss their mode of action (6)
- Q.3 (a) Enlist the factors that affect the rate of respiration (5)
(b) Write a note on Krebs's cycle (7)
- Q.4 (a) Define Source and Sink. Elaborate the mechanism of phloem loading (6)
(b) Differentiate between Apoplastic and Symplastic pathways (6)
- Q.5 (a) Write a detailed note on the structure and physiochemical properties of water (6)
(b) Define water potential. Also discuss its components (6)
6. (a) Discuss the organization of photosynthetic apparatus (6)
(b) Differentiate between PSI and PSII (6)
- Q.7 How does deficiency in macro and micro-nutrients disrupt the growth and metabolism of plants? Explain with suitable examples (12)
- Q.8 (a) Discuss Gene regulation amongst Prokaryotes with suitable example/s (6)
(b) How does signaling in two component system control osmoregulation? (6)
- Q.9 (a) Define phytochromes. What role do they play in turgor response? (6)
(b) Write a note on Pentose Phosphate pathway (6)



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Subject: Botany
PAPER: XI (Environmental Biology)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 60

NOTE: Attempt any FIVE questions. All questions carry equal marks.

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| Q1 | a) Write a brief note on different types of salt effected soil. | 6 |
| | b) What are important measures to reduce salinity? | 6 |
| Q2 | a) How global warming is taking part to changing over earth's climate. | 6 |
| | b) What is acid rain? Give a brief detail. | 6 |
| Q3 | a) Write a note on major problems of wetland. | 6 |
| | b) How water logged soil effect the crops production. | 6 |
| Q4 | a) Write a note on heavy metal pollution. | 6 |
| | b) What are important measures to overcome the effect of radiation pollution? | 6 |
| Q5 | Write a note on water pollution | 12 |
| Q6 | a) Write a note on types of erosions. | 6 |
| | b) Write down different methods to control soil erosion | 6 |
| Q7 | What do you know about radiation pollution. | 12 |
| Q8 | a) Write a note on importance of forests. | 6 |
| | b) What are the major problems of Pakistan. Discuss in detail with reference to environment. | 6 |



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Subject: Botany
PAPER: X (Molecular Genetics)

TIME ALLOWED: 3 hrs.
MAX. MARKS: 60

NOTE: Attempt any FIVE questions. All questions carry equal marks.

1. (a) Why we call DNA a genetic material? How DNA replications take place in eukaryotes? How many different types of proteins involved in prokaryotic DNA replication? (8 marks)
(b) Why DNA replication is always from 5-3 end? (4 marks)
2. Write note on the following (6x2 = 12 marks)
 - a. Inheritance of multiple alleles
 - b. Crown gall disease in plants
3. What are restriction enzymes? Describe different types of restriction enzymes, their role in cutting and forming recombinant DNA molecule? (12 marks)
4. Define / differentiate between following terms clearly (2x6 = 12 marks)
 - a. Transcription / Translation
 - b. Plasmid / Episome
 - c. Point mutation / Frame shift mutation
 - d. Start codon / stop codon
 - e. Conjugation / transduction
 - f. Allele / gene
5. What do you know about extra chromosomal inheritance? Explain cytoplasmic pattern of inheritance in fungi and extra-genomic plasmids in eukaryotes. (12 marks)
6. What is reversion? Where does it take place? Explain different ways of reversion. (2+2+8)
7. What is site specific recombination? How recombination and rearrangement of chromosomes take place? Explain. (12 marks)
8. What are the molecular bases of mutations (at the level coding of genes)? Explain the biological DNA repair mechanisms damage done by various mutagens (12 marks).
9. Outline the basic features of an experiment to map genes in a bacterium. Distinguish between the ways by which gene transfer is affected in conjugation mapping, transduction mapping and mapping involved in transformation (12 marks).